

Standard PID Tuning Methods

(tbco 2/17/2012)

Ziegler-Nichols Method (Closed-loop P-Control Test)

- Step 1: Determine the sign of process gain (e.g. open loop test as in Cohen-Coon).
- Step 2: Implement a proportional control and introducing a new set-point.
- Step 3: Increase proportional gain until sustained periodic oscillation.
- Step 4: Record ultimate gain and ultimate period: K_u and P_u .
- Step 5: Evaluate control parameters as prescribed by Ziegler and Nichols

Table 2. Ziegler Nichols Tuning Rules

	K_c	τ_{Int}	τ_{Der}
P	$\frac{K_u}{2}$		
PI	$\frac{K_u}{2.2}$	$\frac{P_u}{1.2}$	
PID	$\frac{K_u}{1.7}$	$\frac{P_u}{2}$	$\frac{P_u}{8}$

Tyres-Luyben Method (Closed-loop P-Control test)

- Step 1-4: Same as steps 1 to 4 of Ziegler-Nichols method above
- Step 5: Evaluate control parameters as prescribed by Tyres and Luyben

Table 2. Tyres-Luyben Tuning Rules for PI and PID

	K_c	τ_{Int}	τ_{Der}
PI	$\frac{K_u}{3.2}$	$2.2P_u$	
PID	$\frac{K_u}{2.2}$	$2.2P_u$	$\frac{P_u}{6.3}$